

SMOKE TESTING PROCEDURES OUTFALL SEWERSHED BALTIMORE CITY PROJECT 1039





The information contained in this manual is not intended to address or account for all situations or circumstances encountered, rather it provides the user with general guidelines of the procedures to be followed for Smoke

Testing in the Outfall Sewershed



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I. Introduction to Smoke Testing

Smoke testing is a cost effective method used to locate system defects and sources of inflow and infiltration (I/I) in piped conveyance systems.

The principal I/I sources that may be identified through smoke testing include:

- Cracked or broken sewer pipes
- Missing or broken cleanouts
- Leaking manholes
- Illicit connections to sanitary sewers (roof leaders, sump pumps, etc.)
- Cross-connections between storm and sanitary sewers

Inflow and infiltration are terms used to describe how groundwater and stormwater enter dedicated sanitary sewer collection systems. Dedicated sanitary sewers are pipes that are designed to transport wastewater from sanitary fixtures inside buildings to a wastewater treatment facility. Sanitary fixtures include toilets, sinks, bathtubs, showers, and washing machine drains.

Inflow is defined as stormwater that enters the sanitary sewer system through a direct connection to the system. Sources of inflow include footing or foundation drains, roof drains or leaders, downspouts, drains from window wells, outdoor basement stairwell drains, driveway drains, sump pumps, cross-connections between storm and sanitary systems and even streams. Many of these sources are improperly or illegally connected to the sanitary sewer system via either direct connections or through discharge into fixtures that are directly connected to the sewer system.

Infiltration is defined as groundwater that enters the sanitary sewer system through physical defects in the sanitary sewer pipes or manholes. Physical defects in sanitary sewer pipes or manholes can be caused by age-related deterioration, loose joints, poor design, installation or maintenance errors, damage, or root intrusion. Groundwater can enter the collection system via infiltration when the sewer pipes are located below the groundwater table or when the soil above the sewer pipes becomes saturated.

Smoke testing is the process of using a gas-powered blower to force a non-toxic smoke into designated sections of sanitary sewer. These pipe sections are typically isolated from the rest of the system through the use of sandbags. The smoke quickly fills the main sewer line and any connections to it, and then follows the path of any leaks or improper/illegal direct connections, revealing sources of infiltration and inflow, respectively.

II. Smoke Testing Notification Protocol

It is essential that all pertinent City of Baltimore municipal departments are notified of when and where smoke testing will be conducted. The City Police Department, City Fire Department, 311, and the City Department of Public Works are all likely to receive calls from concerned residents despite efforts to fully inform the public in advance. The residents in the areas to be smoke tested must be notified about the testing via flyer and door hanger. These materials describe the smoke testing process, why it is being conducted, what to do to prepare for testing, and what to do if smoke enters the resident's house. Advance notification allows residents with special requirements to inform the Outfall Sewershed (OFSS) Team before the testing is done so that the necessary arrangements can be made. Typically these special requirements involve health concerns such as the effects of testing on a resident with a respiratory condition.

Notifications Made by OFSS Team

The City Police Department, City Fire Department, Local Fire Departments, 311, Local Agencies, Health Commissioner, Council Members, Senators, Delegates, Public School Safety Officer, Community Associations, and other pertinent local officials were informed by the Consultant via mail and phone that the OFSS Team's Subconsultant would be conducting smoke testing in the Outfall Sewershed.

Advance Notice to the Public

The smoke testing Subconsultant is responsible for delivering the smoke testing flyers and door hangers prior to testing in accordance with the Smoke Testing Notification Protocol established by the City of Baltimore. Flyers and door hangers will be provided by the OFSS Team. The timeline for delivery of notifications is as follows:

- <u>Two to Four Weeks</u> prior to smoke testing an area, the Subconsultant must complete door to door distribution of the **Smoke Testing Flyer** (including Frequently Asked Questions) to the residents/owners of all residences and businesses within a two block radius of the test locations. See Appendix A for an example of the Smoke Testing Flyer and FAQ's.
- <u>Two to Three Days</u> prior to smoke testing an area, the Subconsultant must place the **Door Hanger** on the door of each residence and business directly involved or adjacent to the locations being tested. See Appendix B for an example of the Smoke Testing Door Hanger.

Daily E-mails to Stakeholders

Before commencing work each day, the Subconsultant must send an e-mail to all pertinent government officials describing the testing activities scheduled for that day. This e-mail must include color PDF maps (with a legend) which show the testing locations. The list of officials to receive daily e-mails and their e-mail addresses will be provided by the OFSS Team. The OFSS Team Project Manager and Smoke Testing Coordinator must be copied on these daily e-mails. The smoke testing daily e-mail must conform to the format outlined below in Figure 1.

All,

Attached are maps showing the areas that will be affected by the smoke testing inspections being conducted in the Outfall Sewershed on (DATE OF TESTING). The pipe segments that will be tested are highlighted in red on the maps.

If you have any questions regarding the smoke testing inspections, please contact John Doe.

Thank you,

John Doe Project Manager Subconsultant Name Cell: 999-999-9999

Figure 1 - Smoke Testing Daily E-mail Format

III. Preparation for Testing

Smoke tests involve many hours of labor, have the potential to affect the occupants of buildings connected to the collection system being tested, and disrupt traffic. The key to efficient smoke testing is to have the work well planned in advance. An experienced smoke testing crew can test up to 10,000 LF of sanitary sewer in an 8-hour day if the smoke testing has been well laid out in advance. The OFSS Team will provide the Subconsultant with 100 scale plat maps of the sewer system for the areas to be tested. These maps will include, at a minimum:

- Sanitary Sewer Pipes with Sewer ID, Flow Direction, and Pipe Size
- Sanitary Manholes with Manhole ID
- House Connections
- Streets with Street Name
- Parcels with Address Number
- Flowbasin Boundaries with Basin Name
- Pipes to be tested will be highlighted in red

Manholes to be used for blower placement should be predetermined and accessed prior to commencing the test. When determining which manhole(s) will be used for installation of the blower(s) the Subconsultant should try to avoid busy intersections. The safety of both the field crew and the general public must be considered when designing each test set-up. If the manholes to be opened are located in the street, the field crew must install the appropriate signs, barricades, or other measures to ensure proper traffic control.

When it is necessary to place blowers or sandbags at manholes on busy streets, two or more additional crew members may be needed to assist in moving barricades and directing traffic. All workers must wear approved safety vests at all times, both to alert drivers when they are in the street and to clearly identify all members of the crew to the public, particularly when members must enter private property. All workers must also have proper identification from the Subconsultant. The Subconsultant is responsible for providing maintenance of traffic and any permits required to complete the smoke testing.

Manholes that are designated to be opened in order to perform a smoke test should be located and checked prior to commencing the test set-up. At a minimum, the crew must confirm that the manhole cover can be easily removed and perform a quick inspection for unusually high flow or other problems that would need to be investigated or repaired before performing smoke testing.

IV. Field Procedures

Smoke testing should only be conducted on dry days when the ground is not saturated or frozen. Wet or frozen ground prevents smoke from travelling through the soil, which prevents the detection of defects. Typically, smoke testing is effective regardless of ground surface, type of soil, or depth, provided that openings exist that the smoke can follow to the surface. It is not uncommon to observe smoke escaping from cracks in paved surfaces, indicating points where surface water may enter the sanitary sewer system.

As illustrated in Figure 2, two or more sections of sanitary sewer can be tested with one test setup. A maximum of 1,000 LF of sewer pipe per blower should be tested at one time to ensure that smoke fills all of the sewer main and connected laterals. In general, test durations should not exceed 15-20 minutes, which will allow the crew adequate time to walk the entire test area, record all observations, and take photographs of each observation.

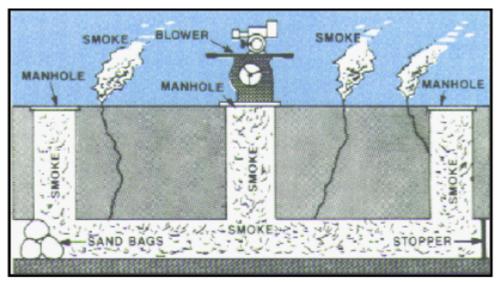


Figure 2 - Smoke Test Set-Up

The smoke testing process begins by placing a gas-powered blower over a centrally located manhole and forcing a harmless, non-toxic smoke into designated sections of sanitary sewer. Sandbags should be placed in the far side of the furthest upstream manhole and furthest downstream manhole of the test section prior to beginning the test. Sandbags are used to retain the smoke within the test section. They can also be used to isolate a pipe segment from smoke testing.

Once the smoke is injected, the blower forces the smoke through the sewer pipes. The smoke, under pressure, will quickly fill the main sewer line and any connections to it, then follow the path of any leaks to the ground's surface, revealing sources of infiltration. Smoke may also be seen from storm drains, area drains, downspouts, stairwell drains or other sources connected directly to the sewer system. Smoke from these assets may indicate that these are sources of inflow into the sanitary system. Figures 3 and 4 show smoke rising from sources of infiltration and inflow.





Figure 3 - Smoke from Service Lateral Defect

Figure 4 - Smoke from Downspout Connection

It is typical for smoke to begin flowing from the roof vents of nearby buildings in less than a minute after placing the blower over the sanitary manhole (see Figure 5 below). The blower should continue to inject smoke into the sewer until the crew has checked all buildings, surrounding grounds, and streets within the test area for signs of smoke and taken photos of the smoke observations. If smoke backs up into the blower immediately after starting the test, this could indicate a line blockage. In this situation, the test should be stopped and the City notified immediately of the potential sewer blockage.



Figure 5 -Smoke from Roof Vent

Although smoke testing can be done with just two workmen, a crew of three is usually more efficient. One person shall be charge of initiating the test and watching over the blower. The other two workmen should start on opposite sides of the street and quickly walk the test area looking for signs of smoke. These two workers should be provided with flags for marking the exact location of smoke escaping from the ground, pavement crack, or other defect location. They also shall carry a field form attached to a clip board. See Appendix C for an example of a properly filled out smoke testing field form. For

each observation of smoke, the crew member must fill in every column on the field form. Source type, location, sector, and severity should be coded numerically according to the legend at the bottom of the form. Each observation entry should reference the number of the associated photograph(s).

In addition to completing the field form, the crew must mark up the field map with test information. The information contained in these field maps is essential to the accurate recording of the test set-up and observation locations. See Appendix D for an example of a properly completed smoke testing field map. These maps should be marked up in the field according to the following procedure:

- Highlight all sewer pipes included in the test and record the test number on the map
- Circle the manhole(s) where blower(s) are placed and label the manhole "B Test No."
- Draw an arrow pointing to the location of each sandbag and label it "SB Test No."
- Place an "x" at the location of each observation and record the observation number on the map
- Place an "S" on any lot where smoke is seen coming from the roof vent pipe of the building
- Include any other information the field crew considers important to the test

Each smoke observation must have at least one corresponding photograph. See Figures 6 through 9 for examples of photographs that capture all pertinent information. Photographs should show at a minimum:

- An area view which includes the location where smoke is escaping (marked by an orange flag), the surrounding property, and a house number if possible
- A close-up view that shows the actual smoke source (cleanout, catch basin, etc.) and the exact point where the smoke is escaping from the source. This photo should be far enough from the source to illustrate the quantity of smoke escaping (trace amount, billows of smoke, etc.)



Figure 6 - Smoke from Broken Cleanout Cap



Figure 7 - Smoke from Missing Cleanout Cap



Figure 8 - Smoke from Catch Basin



Figure 9 - Smoke from Area Drain

If all necessary information cannot be captured in one photograph, then the field crew must take multiple photographs. All photographs must be taken before the smoke has dissipated.



Crew filling out smoke testing forms, flag identifies location of smoke observed during the test.



Inspector video taping smoke/ defect location

All observations and source defects identified during each test shall be photographed and/or video taped to accurately define leak locations. The pictures can also be helpful in convincing property owners that they have a defect. Include addresses and specific

locations of any defects in the photographs or videos for a way to verify the accompanying written documentation. Inspection crews should carry display boards to write a location reference and photograph number and place it where it can be seen when the picture is taken.





Inspector using flags to locate smoke during the test

Example of smoke/ defect location test photograph

All smoke testing activities must be performed in accordance with the EPA SSES Handbook and NASSCO Guidelines and shall follow sound engineering practices.

V. Smoke Testing Data Delivery

All field maps, field forms, notes, and photographs that are accumulated in the field during a smoke test should be compiled into a comprehensive report that includes all pertinent testing data. All photographs must be saved in digital JPEG format.

All data entries on the smoke testing field forms must be complete and legible. Markups of field maps, including test set-up and observation locations, should be neat. If any data provided by the OFSS Team on the field maps is missing or incorrect, the Subconsultant is expected to make note of these instances, which may include unidentified manholes, non-existent manholes, new pipe segments, abandoned pipe segments, incorrect flow arrows, and any other observations needed to correctly update the maps.

All notes, photographs and findings that are accumulated in the field must be imported into the Smoke and Dyed Water Testing Database. Hand-written field data that has passed the Subconsultant's QC process will be organized and stored by the Subconsultant in the Access database. See Appendix E for the Users Guide for the Smoke and Dyed Water Testing Database. This Access database was designed to facilitate the population of smoke and dye testing information, observation data, and photograph records according to the database schema and specifications outlined in the Smoke and Dyed Water Testing section of the Baltimore Sewer Evaluation Standards (BaSES) Manual (Appendix 6-6).

Smoke testing data will be delivered to the OFSS Team weekly. Each delivery must include:

- Smoke and Dyed Water Testing Database, including all smoke testing completed to date
- Field Forms
- Field Maps (in color)
- Photographs (divided into subfolders by date of testing)

The Subconsultant shall review all data prior to any submissions to correct questionable, illegible, or incorrect data.

Smoke testing field work will be suspended for one week following the first data submission. During this week the data will be reviewed and QC comments will be forwarded to the Subconsultant. The Subconsultant shall modify data collection procedures to address any QC comments. If at any time the data submitted is questionable, incomplete or illegible, the Subconsultant will be asked to verify and correct the data.

If the Subconsultant finds any issues of immediate concern, the OFSS Team should be notified immediately. If the field crew identifies a defect or maintenance issue that requires immediate attention, it must be classified into one of two categories as described below:

- Emergency any severe defect such as a collapsed pipe segment, major structural defect in a manhole or pipe segment, missing manhole cover or any other defect which may present a hazardous situation or could lead to an improper sewer discharge.
- Priority any defect or maintenance issue that should be addressed in order to prevent it from escalating to a classification of "emergency." Examples may include heavy roots, heavy grease, active surcharge, or other similar defects.

In the event that such a defect is identified, the field crew should prepare a map showing the defect location. The field crew must also provide any available field data, including photographs, which will be useful in identifying and locating the defect. All information regarding the defect shall be collected in such a manner that it can be directly imported into the City's GIS system.

Appendix A
Smoke Testing Flyer





August 14, 2008

Dear Baltimore City Resident:

To improve our sewer system, the City of Baltimore, Department of Public Works has contracted Dewberry/Brown & Caldwell to conduct smoke testing during the next 3 months. The testing is necessary to locate defects in the sanitary sewers in your neighborhood. The investigation is part of a city-wide program in compliance with the City's Consent Decree entered into with the United States Environmental Protection Agency (USEPA) and the Maryland Department of Environment (MDE) to repair Baltimore City's sewer system and reduce wastewater overflow into the Chesapeake Bay and its tributaries. Your cooperation and understanding are appreciated while this important work is undertaken.

Smoke Testing involves introducing smoke into the sewer system and observing the locations where the smoke escapes. The smoke escapes from sewer defects where rainwater or groundwater can enter. To reduce sewer flow, these defects must be identified, located and repaired. If the plumbing in your house is in proper condition, the smoke will not escape into your home. However, if you do have any plumbing problems, smoke will escape from any defective pipes.

To ensure your plumbing (i.e., sinks, shower stalls, etc.), and inside floor drains are properly sealed prior to the smoke test, pour a bucket of water in each drain to fill the trap so that no smoke escapes from the drains. During the test, it is normal for smoke to escape from the vent pipe through the roof of your home and this should cause no alarm.

The smoke used in this test is not harmful to people, pets or furnishings. We respectfully request your assistance by notifying handicapped or homebound persons in your neighborhood of this test.

A reminder door hanger will be distributed a few days prior to the Smoke Test. It is not necessary for you to be home during the inspection. However, the inspectors may need to walk onto your property to look for signs of smoke coming from area drains, downspouts or the ground.

If you have any questions or observe smoke escaping from any place other than the roof vent pipes, please notify one of the field personnel conducting the test. If you have any questions regarding the smoke testing program, please call the **Dewberry/Brown & Caldwell 24-hour Outfall Sewershed Smoke Testing Information Line at 443-824-9420**, Baltimore City Department of Public Works Project Manager, Sam Edoror, at 410-396-3440 between 8:00 A.M. and 4:30 P.M., or if immediate attention is required after hours, please call 311. Please refer to the attached Frequently Asked Questions for further information.

Smoke Testing Frequently Asked Questions

In order to improve your sewer service, the sanitary sewer pipes near your home will be inspected for possible water leaks by means of smoke testing.

Smoke testing can help locate defective connections that home/business owners or occupants may not know exist.

The tests will be conducted by Dewberry/Brown & Caldwell, under contract with the Baltimore City Department of Public Works (DPW). Note, smoke testing will not be done during or immediately after rain storms because smoke will not travel through water-soaked ground.

Below are frequently asked questions about the process. If you have additional questions, please call Dewberry/Brown & Caldwell 24-hour Outfall Sewershed Smoke Testing Information Line at 443-824-9420, Baltimore City Department of Public Works Project Manager, Sam Edoror, at 410-396-3440 between 8:00 A.M. and 4:30 P.M., or if immediate attention is required after hours, please call 311.

Q. What is smoke testing and why is it conducted?

A. Smoke testing is the process of using a gas-powered blower to force a harmless non-toxic fog, which resembles smoke, into the sanitary sewer lines to locate water leaks. The smoke will be noticeable wherever there is a leak in a sanitary sewer pipe. The City of Baltimore Department of Public Works is conducting smoke tests as part of an on-going program to detect leaks within the sewer collection system. Locating and correcting these problems will greatly reduce the possibility of sewage backups or overflows occurring.

Q. Is the smoke harmful?

A. NO. The smoke has a slight odor and may make you cough, but it is not harmful to people or pets. It will not damage your plants, clothing or furnishings. The smoke leaves no residue or stains.

Q. Will smoke come into my home/business and if so, what should I do?

A. Smoke may enter your home/business through drains—for example, washing machine drains. Smoke may also escape from the vent pipe on the roof of your home/business, which is normal. Smoke should exit the vent stacks of the surrounding properties within the testing area. **Smoke may also enter your home/business if your plumbing is not in proper operating condition due to defects or because your sink/floor drain traps do not have water in them.** If traces of smoke or its odor are detected in your home/business, there is a possibility that lethal or explosive gases from the sewer system could also be entering the building at other times. Sewer gases can be dangerous, and some of these gases have no odor or color, and can enter a building undetected. If smoke from these tests does enter your home, Baltimore City Department of Public Works strongly advises you to contact a licensed plumber as soon as possible to check for faulty plumbing fixtures and take appropriate measures to repair defects.

If smoke enters your home/business, open windows for ventilation and the smoke should disappear quickly. Please identify and contact the crew working in the area to let them know smoke has entered your home/business. Personnel will be available to assist you in locating the source of the smoke. Please be certain to request and obtain proper identification from any city employee or contractor before allowing them to enter your home for further inspection.

Q. What should I do to prepare for smoke testing?

A. As the possibility exists for smoke to enter your home/business via a defect in the sewer pipes, it is recommended to prepare your home/business as much as possible so that 'normal' non-defective drains will not permit entry of smoke.

A drain trap, the S-shaped curvature in the pipe typically found under sinks, exists to 'trap' a level of water and block sewer gases from entering the home/business. To prepare for smoke testing, pour a small amount (more than a cup but less than a quart) of water into each floor and sink drain or simply run the faucet for a few minutes the night prior to smoke testing. This will fill the traps and block the smoke. A dry trap will be found in drains that are not used regularly such as basement and garage drains. This can allow smoke to enter the home/business. Note, seldom-used floor drains, bathrooms and deep sinks (dry traps) may exist in your home/business. If a sink is left unused for a period of time, traps will normally dry out. Simply run water into them.

If someone in your home/business is homebound or has emphysema, asthma, or other respiratory conditions, please call the Dewberry/Brown & Caldwell 24-hour Outfall Sewershed Smoke Testing Information Line at 443-824-9420, Baltimore City Department of Public Works Project Manager, Sam Edoror, at 410-396-3440 between 8:00 A.M. and 4:30 P.M., or if immediate attention is required after hours, please call 311 to further discuss your situation and ensure the comfort

and safety of yourself and other such persons.

Your cooperation is also requested in notifying disabled or homebound persons in your neighborhood of these tests.

Q. I will not be at home during the smoke testing and have pets in the house. What should I do?

A. The smoke is not harmful to pets; however, leave several windows partially open for ventilation should any smoke enter the building. If you have proper connections and all of the traps have water in them, there should not be any problems.

Q. Will the City require me to fix the plumbing in my home or business if smoke enters the building?

A. Baltimore City will not require property owners to fix their plumbing unless the connection is considered an "illegal connection" as defined by the Baltimore City Code. Connections that allow groundwater or storm water to drain into the sanitary sewer system such as roof leaders and sump pumps are not permitted and will be reported to the appropriate City Agency for resolution.

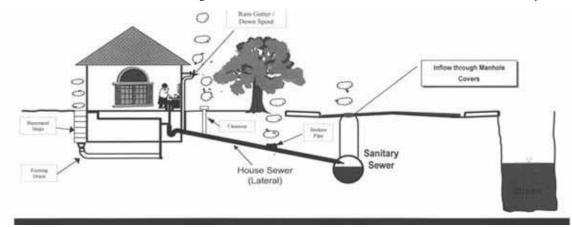
However, the City urges property owners to seek the assistance of a licensed plumber to repair faulty plumbing fixtures as the possibility exists of lethal or explosive sewer gases entering the building.

Q. Can the smoke block the sewers?

A. No. The smoke is actually a fog made up of a vaporous substance and cannot clog a sewer pipe.

Q. What happens if the City finds a bad sewer?

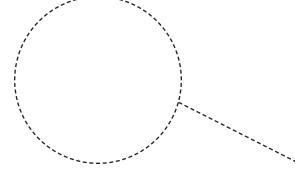
A. This information will be documented and given to the Bureau of Water and Wastewater and the City of Baltimore will



be obligated to determine what steps are necessary to remedy the problem.

Appendix B
Smoke Testing Door Hanger
Smoke Testing Door Hunger





PLEASE READ

Notice to All Residents Baltimore City Is Doing Smoke Testing



In order to improve your sewer service, the sanitary sewer pipes near your home will be inspected for possible water leaks by means of smoke testing.

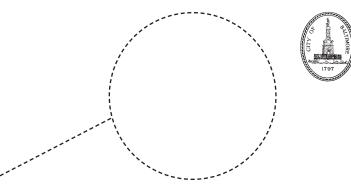
Smoke testing can help locate defect connections that home/business owners or occupants may not know exist.

The smoke testing will take place over the next few weeks with work scheduled to begin each day at 9:00 A.M. and end no later than 5:00 P.M.

The test will be conducted by Dewberry/ Brown & Caldwell under contract with the Baltimore City Department of Public Works (DPW).

During the smoke test, workers will force a HARMLESS, NON-TOXIC FOG into the sewers in your area to locate system defects. This fog, which resembles smoke, has a slight odor but is safe and disappears quickly once doors or windows in your home are open for a short time following this occurrence.

(Turn Over For More Information)





To prepare for smoke testing, pour a cup or more of water into each floor drain and sink drain or run the faucet for a few minutes the night prior to smoke testing.

If someone in your home/business is homebound or has a respiratory condition, please call the Dewberry/Brown & Caldwell 24-hour Outfall **Sewershed Smoke Testing Information Line at** 443-824-9420, and leave your name, address and phone number so that you may be contacted prior to testing to further discuss your situation and ensure the comfort and safety of yourself and other such persons.

During testing, smoke may enter your home/business through drains. Smoke may escape from the vent pipe on the roof of your home/business, which is normal. Smoke may enter your home/business if your plumbing is not in proper operating condition due to defects or because your sink/floor drain traps do not have water in them. If traces of the harmless/non-toxic smoke are detected in your home/business, there is a possibility that lethal or explosive gases from the sewer system could also be entering the building at other times. If this situation occurs, the City of Baltimore strongly advises you to contact a licensed plumber as soon as possible to check for faulty plumbing fixtures and take appropriate measures to repair defects.

If smoke enters your home/business, open windows for ventilation and the smoke should disappear quickly. Please contact our Field Crew Manager at 410-325-4090 to let us know smoke has entered your home/business. Personnel will be available to assist you in locating the source of the smoke.

Should you have additional questions, **please** feel free to contact the Dewberry/Brown & **Caldwell 24-hour Outfall Sewershed Smoke** Testing Information Line at 443-824-9420, **Baltimore City Department of Public Works** Project Manager, Sam Edoror, at 410-396-3440 between 8:00 A.M. and 4:30 P.M., or 311 after hours.

Appendix C
Smoke Testing Field Form

TOTT SAVIN ENGINEERS, P.C. SMOKE TESTING DATA SHEET

PAGE: / OF /

SUBSYSTEM: OUT Fall

OWNER: City of Baltimore TIME: 8:00 AM

PROJECT NAME/ NO: Baltimore Smoke Test 1129.01.02

WEATHER: Dry MAP NO: 470

LOCATION: IrampsTead CT+ Alley

BLOWER: 47

TOTAL FT: 639

SKETCH:

Show sanitary sewer w/ MHs; MH nos; storm sewer w/MH's & CB's; edge of pavment; houses & bldgs w/nos; overflows; ditches; roof leaders; roof vents; yard drains; streams; ponded or low areas; cross connections; sump pumps; basement drains; foundations and

u	inderdrains, etc. (Circle significan
CSEMHIA	
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i S	2021
	207' § 600МН);
8	Julie
Стемні	Catch Basin
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t !	

Smoke Stop

Blower

☐ Catch Basin

004 - STorm Holo

	OBSERVATIONS: (Identify Point No. on sketch)		Severity	Picture No.		
Point No.	DESCRIPTIONS:Use a second page for add. space	Major	Mod	Trace	Roll	Frame
	Catch Basin 2500 #					1
I kannad kan kan kan kan kan kan kan kan kan kan					-	
			<u></u>			
	s: Dye Test Storm Sewer Yes: No:X TV I	nspect: Yes:	N			<u></u>

Manhole

Inspector

George Salanco

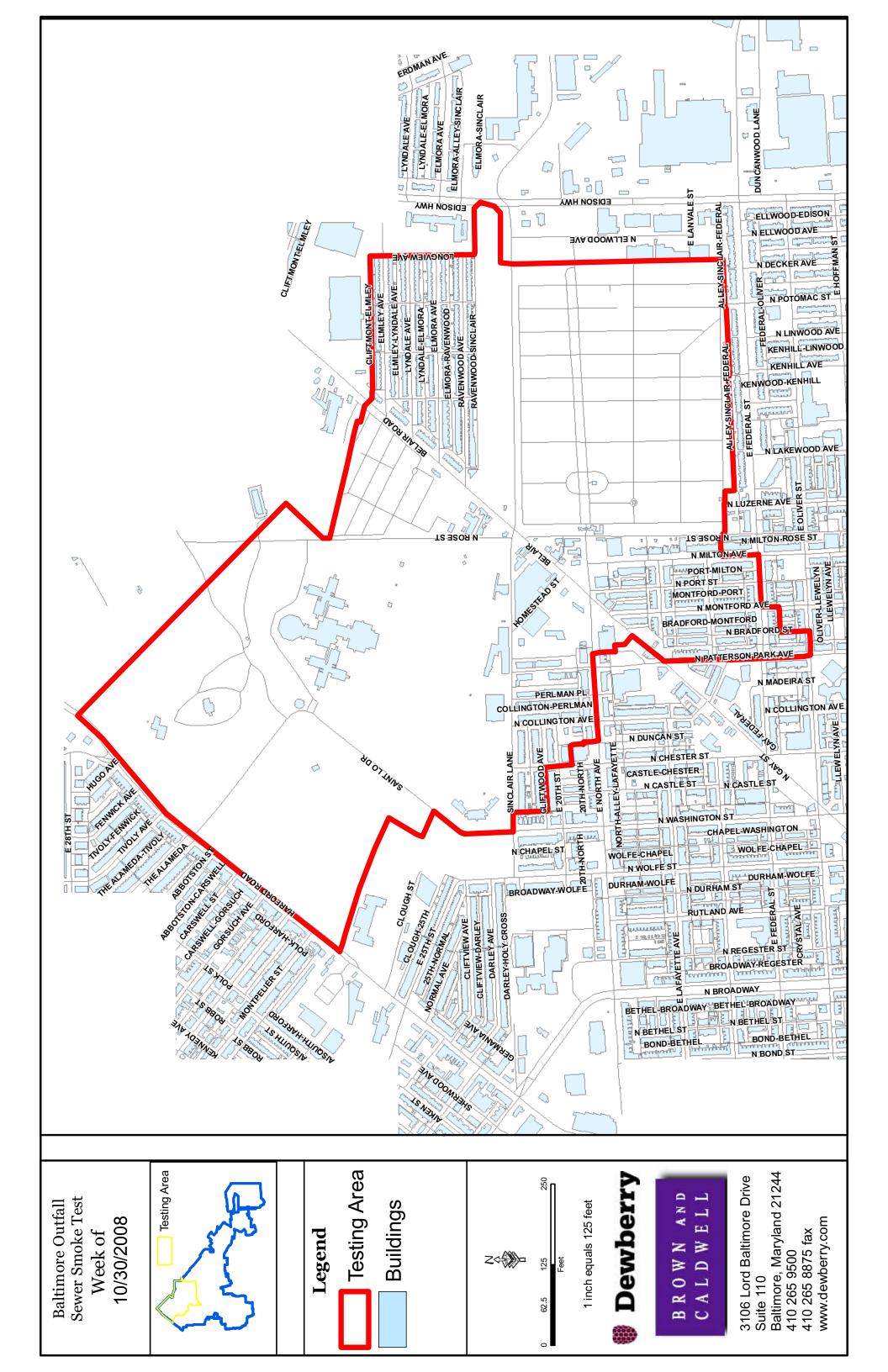
CITY OF BALTIMORE WET W SMOKE AND DYED W	Page <u>2</u> of <u>2</u>	
Sewershed: Outfall	Company: Savin Engineers	Date: <u>10/2/08</u>
Test to be Performed: Smoke: X Dyed Water:	Ground Condition: Dry: X Damp: Wet:	Supervisor: George Salanco
Manhole ID: S47C 018MH	Test ID: 1039-001	Notifications Made: (Residents, Fire, 311)

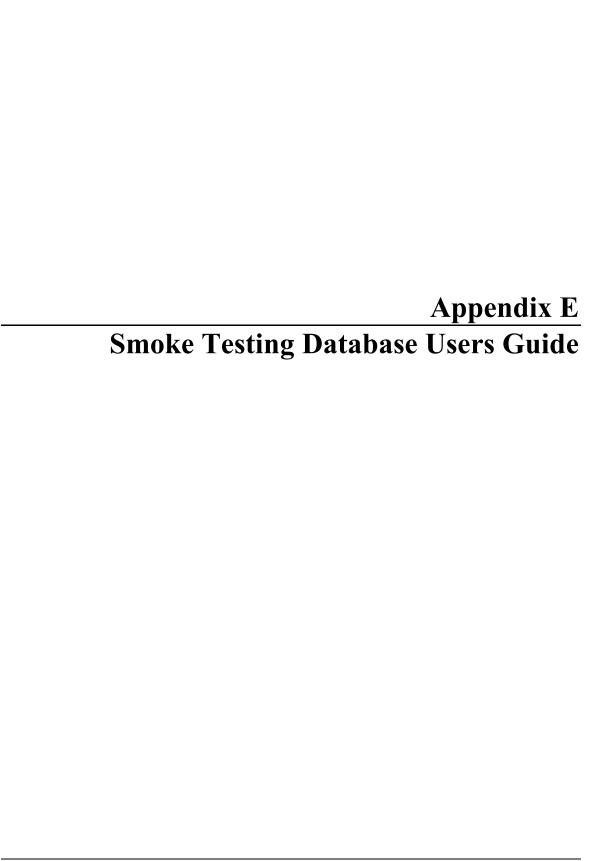
Field Sketch: (Show All Manholes with Numbers, Blower Placement Location, Sandbag or Isolation Locations, Street Names, Building Addresses and Locations, Defect Locations and Photograph Numbers)



1029-001_OB01-01

Appendix D Smoke Testing Field Map





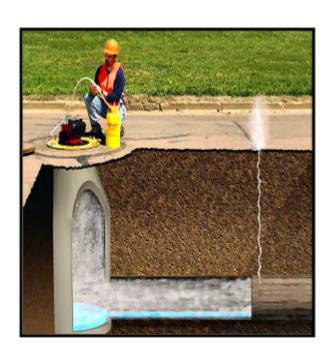


SMOKE & DYED WATER TESTING OUTFALL SEWERSHED BALTIMORE CITY PROJECT 1039



Microsoft Access Database Users Guide and Administrator's Manual

Version 07.01



The information contained in this manual is not intended to address or account for all situations or circumstances encountered, rather it provides the user with general guidelines of the procedures to be followed for Smoke Testing in the Outfall Sewershed



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I. Introduction

The Smoke & Dyed Water Testing Database is designed to facilitate the population of smoke and dye testing information, observation data, and photograph records according to the database schema and specifications outlined in Version 08.03 of the Smoke and Dyed Water Testing section of the Baltimore Sewer Evaluation Standards (BaSES) Manual (Appendix 6-6). The database forms and tables automatically populate the Test ID, Observation ID, Photo ID, and Photo Filename fields per BaSES specifications, allowing the user to focus on entering the data gathered in the field for each smoke test.

All smoke testing data is compiled into one form "frmData_Entry" in the Smoke & Dyed Water Testing database. The "frmData_Entry" includes a header section where general test information is entered as well as the following three tabs: Isolated Sewers, Observations/Photos, and Field Inspection Report. The following table lists the database tables and fields in the Smoke & Dyed Water Testing database along with additional information on how the application manages the field.

Table TEST								
Field	Read-Only	Remark						
TEST_ID	Yes	Field is automatically populated when a new record is created						
TEST_TYPE	No	User must select the type of test performed from a combo box.						
MANHOLE_ID	No	User must enter the manhole ID. The application validates the manhole against the Baltimore wastewater manhole naming convention and informs the user if the entered ID is invalid.						
DATE	No	User must enter the date of the test						
REPORT	Yes	This field automatically populates as the record is saved						
Table OBSERVA	ΓΙΟΝ							
Field	Read-Only	Remark						
OB_ID	Yes	Field is automatically populated when a new record is created						
TEST_ID	Yes	Field is automatically populated when a new record is created						
OB_COMMENT	No	User supplied						
Table PHOTO								

Field	Read-Only	Remark
PHOTO_ID	Yes	Field is automatically populated when a new record is created
OB_ID	Yes	Field is automatically populated when a new record is created
FILENAME	Yes	Field is automatically populated when a new record is created
PHOTO_COMMENT	No	User supplied

II. Opening the Database

When the database is opened, the main user form is automatically displayed as shown in Error! Reference source not found. The form lists all the currently stored smoke and dyed water tests in the database.

Note: If the column header contains an asterisk, the field is automatically populated and managed by the application and can not be edited by the user

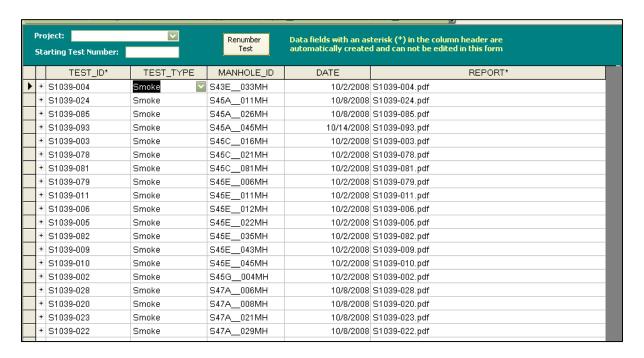


Figure 1 - Main Database User Form

III. Adding a Test to the Database

Before you may enter a new test to the database you must fill in the Project combo box and Starting Test Number textbox fields in the form's header.

Clicking the Project combo box will display a list of all the Baltimore City sewershed projects. Select the appropriate project.

In the Starting Test Number textbox enter the number from which the application will start assigning new test numbers. For a group of sequential tests, this control should only need to be set once. The application will start at this number and count upwards until it finds an unused test number.

With the above two controls set, you can begin entering data in any of the three user-editable fields: TEST_TYPE, MANHOLE_ID and DATE, on the row for a new record. As soon as you begin typing, you will note that the application fills in the TEST_ID field. The Report field is filled in when the TEST record is saved.

IV. Adding an Observation

Clicking the small plus sign on the left side of the TEST record will open a subdatasheet showing all observations for the specific test selected, as shown in Figure 2.

Note: The Comment field is the only user-editable field in the Observation subdatasheet.

To add a new observation, enter a comment, and the OB_ID field will automatically be populated.

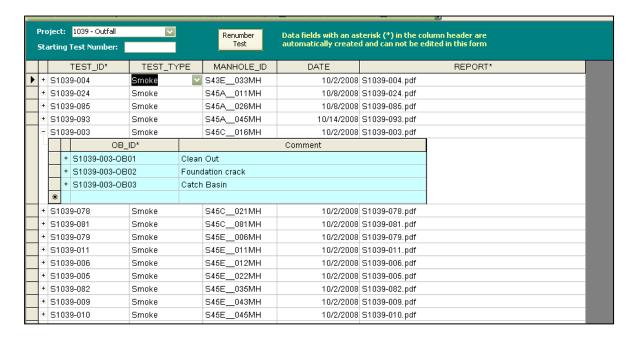


Figure 2 - Observation Records

Note: Observation numbers are assigned sequentially by the application by finding the first observation index number available from 1. This means that the application will "backfill" to populate unused numbers.

For example, if observations 1 through 5 are currently in the database for a particular test and observation #3 is deleted. The next observation added to this test will have an ID index of 3.

V. Adding an Observation Photo Record

Clicking the small plus sign on the left side of the Observation record will open a subform showing all photos for the observation selected, as shown in the figure below.

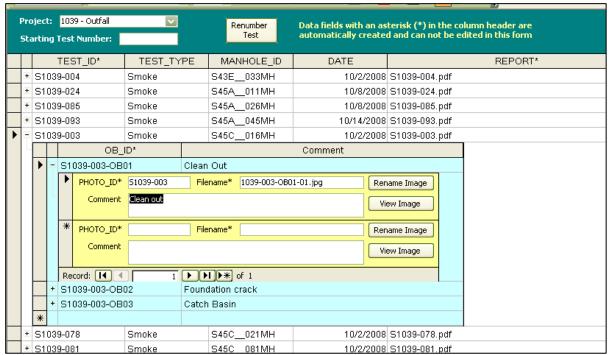


Figure 3 - Observation Photo Form

Note: The Comment field is the only user-editable field in the Photo subform.

To add a new photo, enter a comment, and the PHOTO_ID and Filename fields will automatically populate.

a. Naming Observation Photo Image Files

The Rename Image button can be used to rename photo files to the proper filename as defined in the BaSES specifications. When this button is clicked, a file browser dialog is displayed allowing the user to select the specific image file associated with this observation photo record as shown in Figure 4. Once an image file is selected, the application will properly rename the file so that it is properly linked to the observation photo record.

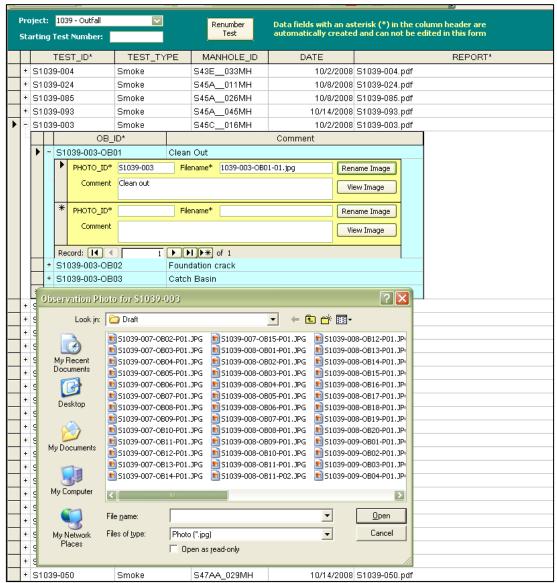


Figure 4 - Selecting an Image File to Rename

b. Viewing Observation Photo Images

The View Image button can be pressed to review currently select observation photo using the computer's default image viewer.

c. Renumbering a Test

The Renumber Test button can be used to modify the name of a selected smoke or dye test. In addition to changing the test name, the utility also updates the children observations and photo data database IDs and renames observation photos and report filenames that are currently linked to the database.

Select a test to renumber and press the Renumber Test button. The application will display the Renumber Test form as shown in Figure 5. The old test index and ID are display in the upper left corner of the form. You can enter a new index value to be used to create a new test ID.

If the Report Folder and Photo Folder are not populated, press the Browse button and select the folder in which the report or photo files exist. If these folder fields are properly set, the application will automatically rename the external report and observation files associated with the renumbered test.

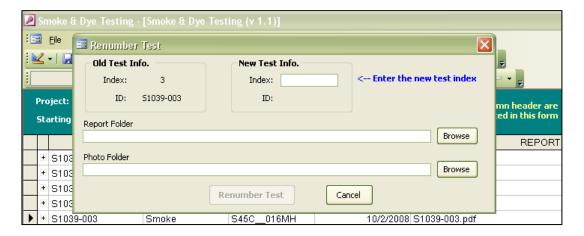


Figure 5 - Renumber Test Form

VI. System Prerequisites

The Smoke & Dye testing database requires the following:

- Microsoft Access 2000 or higher
- Microsoft common dialog ActiveX control 6.0 (comdlg32.ocx)

The common dialog ActiveX control is frequently already installed by other application and usually already installed on must computer. The comdlg32.ocx, along with the following files (comdlg32.dll, comdlg32.oca and comdlg32.dep), are located in Window's System32 folder. If they are not present in the System32 folder, perform the following steps to install and register the ActiveX control:

- 1. Copy the 4 files to this folder
- 2. Open up a command window
- 3. Change the active directory to the system32 folder (i.e. CD C:\Windows\System32)
- 4. Type: regsvr32 comdlg32.ocx

Appendix F Smoke Testing Report

CITY OF BALTIMORE WET WEA		Page 1	of 6		
Sewershed: OUTFALL	Company: REI/DRAYCO	Date: 09/30/2008 Supervisor: E.R.			
Test Type: SMOKE	Ground Condition: Dry: X Damp:_ Wet:_				
Manhole ID: S51II_036MH	Test ID: S1039-009	Notifications Made:X_	_ (Residents, Fire, 3		
ield Sketch: (Show all manholes with num	bers, blower placement location, sandb locations, defect locations and photo		s, building addresses a		
1513 1510 1508 1509 1506 1507 1504 1503 1502 1501 VIH	1509 1507 1505 1503	1508 1506 1504 1504 1502 004MH	020M		
202.1 E OLIVER S 009_OB04_P01 009_OB03_P01	014MH 1429 1427 1425 1423 1421	1418	55.1 © 023 284		
DO9_OB01_P01 Legend Primary and Abandoned Sewers Sewer Smoke Tested Sewer Manhole Blower Location Observation Location Area Not to Smoke Test		1414 1412 1410 1410 1408 7 1406 1404 1401 1401 1400	8 8 284.9		
Flow Basin Boundary Outfall Sewershed Boundary Plat Boundary		I_036MH			

	CITY OF BALTIMORE WET WEATHER CONSENT DECREE SMOKE AND DYED WATER TESTING FORM							Page 2 of 6				
Sewershed: OUTFALL Company: REI/DRAYCO							Date: 09/30/2008					
Test Type: SMOKE			Ground Condition: Dry: X Damp:_ Wet:_					_	Supervisor: E.R.			
M	anhole ID:	S51II_036MH		Te	est ID	: S1	039-009					Auporvidor. E.ix.
Field S	Sketch: (Show										ıs, str	reet names, building addresses
D ()	l	Ċ	and io	cations, de			i '	Draii		pers)	ı	
Defect No.		Address		Source Type	Loca	ition	Sector	Area		Severity		Photo Number
	1409 KEN	HILL AVE.		03	0	7	02	_	1	03	S	1039-009_OB01-P01.jpg
	1421 KEN			03	0		02		1	03		
	1429 KEN			02	0		02		4	03		1039-009_OB03-P01.jpg
	1431 KEN			02	0		02		0	03		1039-009_OB04-P01.jpg
OBOT	TIOT KEN	111227112.		UZ.			UZ.	<u> </u>		- 00	Ť	сое сое_е_е
-												
	1											
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					CED	\		DEC				
	Course	е Туре		OE	Loca		ION CO	חבס		Sector		Severity
01 11/2	ain Sewer	10 MH Frame	01	Paved C			Non-Pa	ved		Public	Ω1	No Smoke
	ervice Line	11 Storm Drain		Asphalt	JUIIC.	11			_	Private	02	
	eanout	12 Catch Basin		Paved C)thor		Alley	Jous	02	rinvale		Moderate
	ownspout	13 Storm MH		Drivewa			Golf Co	urse				Major
	ea Drain	14 Storm Ditch		Sidewall		14		uise			04	iviajUi
	vy. Drain	15 Excavation		Curb	IN.	14	Outer					
	air. Drain	16 Water Line		Yard - F	ront							
	ound. Drain	17 Tele. Pole		Yard - B					-			
	dg. Interior	18 Other							-			
סט טונ	09 Bldg. Interior 18 Other 09 Yard - Side											

Unique Test ID: S1039-009 Date: 09/30/2008 Manhole ID: S51II_036MH

Defect No: OB01 Supervisor: E.R. Basin: Outfall

Location: 1409 KENHILL AVE.

Source Type: 03 Cleanout Sector: 02 Private

Location: 07 Yard - Front Severity: 03 Moderate Drainage Area: 1 ft²

Comments: Smoke is coming from an above grade cleanout with a broken cap.

SMOKE TEST PHOTOGRAPHS



Photograph No: OB01-P01 Filename: S1039-009_OB01-P01.jpg

Unique Test ID: S1039-009 Date: 09/30/2008 Manhole ID: S51II_036MH

Defect No: OB02 Supervisor: E.R. Basin: Outfall

Location: 1421 KENHILL AVE.

Source Type: 03 Cleanout Sector: 02 Private

Location: 07 Yard - Front Severity: 03 Moderate Drainage Area: 1 ft²

Comments: Smoke is coming from an above grade cleanout with a broken cap.

SMOKE TEST PHOTOGRAPHS



Photograph No: OB02-P01 Filename: S1039-009_OB02-P01.jpg

Unique Test ID: S1039-009 Date: 09/30/2008 Manhole ID: S51II_036MH

Defect No: OB03 Supervisor: E.R. Basin: Outfall

Location: 1429 KENHILL AVE.

Source Type: 02 Service Line Sector: 02 Private

Location: 07 Yard - Front Severity: 03 Moderate Drainage Area: 24 ft²

Comments: Smoke is coming from the edge of the sidewalk in front of 1429 Kenhill Ave.

SMOKE TEST PHOTOGRAPHS



Photograph No: OB03-P01 Filename: S1039-009_OB03-P01.jpg

Unique Test ID: S1039-009 Date: 09/30/2008 Manhole ID: S51II_036MH

Defect No: OB04 Supervisor: E.R. Basin: Outfall

Location: 1431 KENHILL AVE.

Source Type: 02 Service Line Sector: 02 Private

Location: 07 Yard - Front Severity: 03 Moderate Drainage Area: 40 ft² Comments: Smoke is coming from the edges and cracks in the sidewalk in front of 1431 Kenhill Ave.

SMOKE TEST PHOTOGRAPHS



Photograph No: OB04-P01 Filename: S1039-009_OB04-P01.jpg